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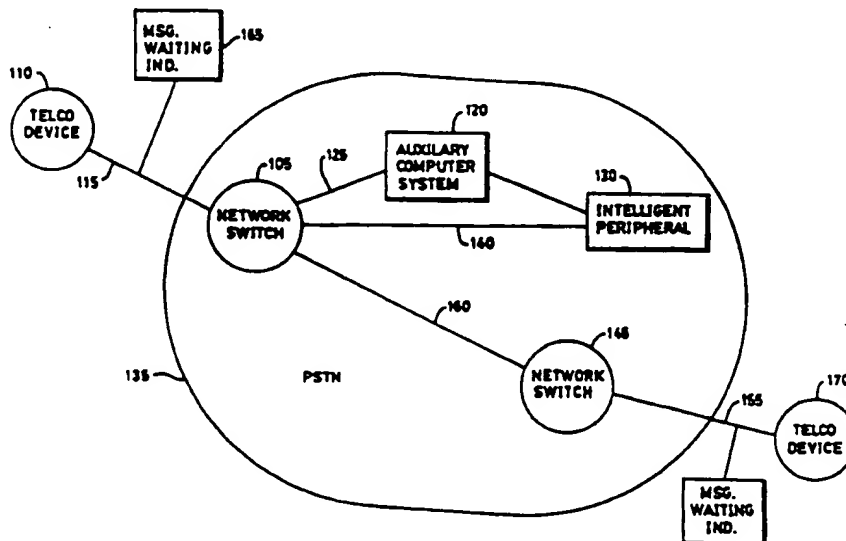
US

(71) Applicant: GTE LABORATORIES INCORPORATED  
[US/US]; 40 Sylvan Road, Waltham, MA 02254 (US).(72) Inventors: PANDHARIPANDE, Milind, M.; 2213 Wren Lane,  
Lewisville, TX 75067 (US). WATTS, Ronald, F.; 413  
Longfellow Street, Highland Village, TX 75067 (US).(74) Agent: MONKS, Lawrence, E.; GTE Telecommunications  
Products and Services, 40 Sylvan Road MS31, Waltham,  
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## (57) Abstract

A method and apparatus for visually or audibly indicating to a served party that messages are waiting (165) on a telephone network-based message accumulation system such as voice mail, FAX store-and-forward, and other telecommunications devices (110). In one embodiment of the invention, the method is utilized in conjunction with a telephone network-based voice mail system or other telephone network-based message accumulation system. The invention is accomplished through the use of auxiliary computer systems (120) which are associated with single or multiple central office switching systems (105). Existing single pair telephone wiring is utilized to couple the telecommunications device (110) and the message waiting indicator apparatus (165) to the telephone network (135), and thus no additional wiring requirements are needed.

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METHOD AND APPARATUS FOR MESSAGE DELIVERY  
USING LOCAL VISUAL/AUDIBLE INDICATION

**Technical Field**

The present invention relates generally to a method and apparatus for notifying a called party that a voice message is available, and more particularly to a method and apparatus for notifying a called party that a voice message is available through a message indicator that is activated by a distinctive ring sequence from the telephone network.

**Background Art**

Conventional telephone network-based voice mail services give no visual indication that a message has been received and is available to be retrieved. Rather, when a telecommunications device goes off-hook after a message has been left, a special dial tone is applied to the line which is not cancelled until the messaging service is called and all messages obtained. This procedure has the disadvantage that the phone must be constantly checked to insure that no messages are waiting.

Thus it is desirable to provide a visual and/or audible indication through the telephone network any time a new message has been received, and thus provide a notification to the user of messages availability. Further it is desirable to provide a visual or aural indication through the telephone network without requiring that a new telephone handset be obtained.

**Disclosure of the Invention**

These and other advantages and objects are incorporated in the instant invention. In one aspect of the invention, a method is disclosed for notifying a called party that a voice message has been received and stored for subsequent retrieval. The telecommunications

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device, generally a telephone handset, is called with a distinctive ring sequence by an intelligent peripheral through an auxiliary computer system connected to a network switch using Advanced Intelligent Network (AIN) technology. If the telecommunications device goes off-hook, a voice message is announced notifying the called party of the stored voice message. Otherwise, the distinctive ring sequence causes a message waiting indicator device connected in parallel with the telecommunications device to activate a visual or audible indication, which might be a lamp, that a voice message has been received and stored.

In another aspect of the invention, a method is disclosed for notifying a called party that a voice message has been received and stored for subsequent retrieval without the requirement for Advanced Intelligent Network (AIN) technology. The telecommunications device, again generally a telephone handset, of the called party is assigned two telephone numbers by the network switch. One number is used for normal service. The second number is used specifically by an intelligent peripheral to activate a message waiting indicator device.

Having stored the new message, the intelligent peripheral operates in the following manner. Intelligent peripheral initiates a call to the telecommunications device using the additional telephone number with a distinctive ringing sequence. The network switch provides ringback tone or busy tone to the intelligent peripheral. If telecommunications device is off-hook the intelligent peripheral disconnects and waits for a specified period of time and retries the call to the telecommunications device. If the telecommunications device is on-hook, the network switch provides a distinctive ring to the telecommunications device. If the telecommunications device does not go off-hook within a complete ring cycle the visual or audible alert on the message waiting

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indicator device is activated, and the call is abandoned after a specified period of time.

In another aspect of the invention, apparatus is disclosed for notifying a called party that a voice message has been received and stored for subsequent retrieval. The telecommunications device, generally a telephone handset, is called with a distinctive ring sequence by an intelligent peripheral through an auxiliary computer system connected to a network switch using Advanced Intelligent Network (AIN) technology. If the telecommunications device goes off-hook, a voice message is announced notifying the called party of the stored voice message. Otherwise, the distinctive ring sequence causes a message waiting indicator device connected in parallel with the telecommunications device to activate a visual or audible indication, which might be a lamp, that a voice message has been received and stored.

#### **Brief Description of the Drawings**

FIG. 1 is a depiction of one embodiment of an Advanced Intelligent Network in which the present invention is implemented.

FIG. 2 is a flow chart of the call flow in accordance with the current invention.

FIG. 3 is an illustration of the parallel connection of the message waiting indicator device to a telecommunications device.

FIG. 4 is a block diagram of a message waiting indicator device.

FIG. 5 is a depiction of one embodiment of a telephone network in which the present invention is implemented.

#### **Best Mode for Carrying Out the Invention**

Referring to FIG. 1, a network switch 105 incorporating Advanced Intelligent Network (AIN) Switching

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Capabilities is connected to a telecommunications device 110 by a telephone line 115 of conventional twisted pair wiring. Network switch 105 is coupled to auxiliary computer system 120 via a communications link 125. Communication link 125 may in one embodiment of the invention use the SS7 protocol to communicate between auxiliary computer system 120 and network switch 105. Network switch 105 is further coupled via a voice channel to intelligent peripheral 130 either through the public switched telephone network (PSTN) 135 or via a direct link 140; in either case auxiliary computer system 120, provides control signalling to intelligent peripheral 130. Control signalling may be accomplished through SS7, X.25 or ISDN communications protocols. One of ordinary skill in the art will recognize that other communication protocols may be utilized without departing from the scope of the invention.

A second network switch 145 is connected to a second telecommunications device 170 by a telephone line 155 of conventional twisted pair wiring. Telecommunications device 170 need not be connected to a separate network switch 145 as shown for exemplary purposes in FIG. 1 but may be connected to network switch 105 while at the same time conforming to the scope of the present invention. Network switch 105 and network switch 145 are coupled by a communications link 160, providing voice and signaling channels between the switching systems within the public switched telephone network 135 (PSTN). While there is shown in FIG. 1 a direct connection 160 between network switch 105 and network switch 145, this by example only, and one of ordinary skill in the art will recognize that the connection may involve passing through multiple switches using multiple communication links. A message waiting indicator device 165 for indicating that a message has been received and stored is bridged across the telephone line 115 for telecommunications device 110.

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Message waiting indicator device 165 is located at the customer's premise.

With reference to FIG. 1 and the flow chart of FIG. 2, the inventive method is now described. A caller at telecommunications device 170 places a phone call to telecommunications device 110 which is connected in parallel to a message waiting indicator device 165 as shown in FIG. 3. Telecommunications device 110 is served by a voice mail storage service when telecommunications device 110 is either busy with another call or fails to answer a call. If telecommunications device 110 does not answer the call or is currently off-hook (i.e., busy), the call is forwarded to the voice-mail storage service provided by intelligent peripheral 130, and any voice message is stored at the intelligent peripheral's 130 storage device.

Having stored the new message, intelligent peripheral 130 operates in the following manner. Intelligent peripheral 130 sends a query to auxiliary computer system 120 requesting whether telecommunications device 110 is either off-hook (i.e., busy) or available to receive a call. Auxiliary computer system 120 queries network switch 105 as to the status of telecommunications device 110, informing intelligent peripheral 130 of that status. If telecommunication device 110 is off-hook, intelligent peripheral 130 waits for a specified period of time and retries the call to telecommunications device 110. If intelligent peripheral 130 is notified by the network switch 105 that telecommunication device 110 is on-hook, intelligent peripheral 130 issues a request to network switch 105 via auxiliary computer system 120 to call telecommunications device 110 with a distinctive type of ringing sequence. In one embodiment of the invention, the ring sequence used is a triple ring sequence in accordance with the type 3 ring sequence of the LSSGR Bellcore specification on ring sequences.



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If telecommunications device 110 does not go off-hook within a complete ring cycle the visual or audible alert on the message waiting indicator device 165 is set. Message Waiting Indicator device 165 includes circuitry for detecting only the distinctive ring demanded by intelligent peripheral 130. No other type of ring, including a normal ring sequence, sets the message waiting indicator lamp, thus, the circuit is fully compatible with a normal type 1 ring sequence and so-called teen line or type 2 ring services. If telecommunications device 110 goes off-hook, intelligent peripheral 130 responds with an announcement that a voice mail message is available. Message waiting indicator device 165 is turned off by manually resetting the device or by automatically resetting the device at off-hook detection.

Referring to FIG. 4, one embodiment of the message waiting indicator device 400 is now described. A telecommunications device 405 is connected to the incoming telephone line in parallel with message waiting indicator device 400. The telephone line is connected to an opto-coupler 410 for converting the line voltage levels to a TTL voltage level, consistent with the electronics of message waiting indicator device 400. Opto-coupler 410 also isolates the message waiting indicator device electrically from the telephone line. Opto-coupler 410 may consist of a photodiode in series with a photovoltaic detector. The TTL output signal from opto-coupler 410 is fed into two monostable multivibrators 420 and 430. Monostable multivibrator 420 detects a ringing voltage level, and outputs a 800ms pulse to a programmable counter 440 for counting the number of rings received from the line. Monostable multivibrator 430 resets programmable ring counter 440 in 1.8 seconds which is sufficient time to allow three ring pulses to be counted based on LSSGR type 3 ringing. One of ordinary skill in the art will recognize that using this system any number of rings can

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be counted depending on the programming of programmable counter 440, and the timing of monostable multivibrators 420 and 430. Upon detecting the specified ring sequence, programmable counter 440 signals a driver circuit 450 to arm the audible or visual device 460.

Referring to FIG. 5, another embodiment of the invention is shown wherein no auxiliary computer system is present. Communications link 505 transmits both voice and control information for communications between network switch 510 and intelligent peripheral 515. Telecommunications device 520 is assigned two telephone numbers, one for normal service, and one specifically for the use of intelligent peripheral 515. The additional telephone number is assigned a distinctive ring sequence in the database of network switch 510. Intelligent peripheral 515 maintains in its database the ability to relate the two telephone numbers.

A caller at telecommunications device 525 places a phone call to telecommunications device 520 which is connected in parallel to a message waiting indicator device 530 as shown in FIG. 3. Telecommunications device 520 is served by a voice mail storage service when telecommunications device 520 is either busy with another call or fails to answer a call. If telecommunications device 520 does not answer the call or is currently off-hook (i.e., busy), the call is forwarded to the voice-mail storage service provided by intelligent peripheral 515, allowing a message to be left by the caller. Any voice message is stored at the intelligent peripheral's 515 storage device.

Having stored the new message, intelligent peripheral 515 operates in the following manner. Intelligent peripheral 515 initiates a call to the telecommunications device 520 using the additional telephone number with a distinctive ringing sequence. Network switch 510 provides ringback tone or busy tone to intelligent peripheral 515. If telecommunications device 520 is off-hook intelligent

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peripheral 515 disconnects and waits for a specified period of time and retries the call to the telecommunications device 520. If telecommunications device 520 is on-hook, network switch 510 provides a distinctive ring to telecommunications device 520. If telecommunications device 520 does not go off-hook within a complete ring cycle the lamp on the message waiting indicator device 530 is activated, and the call is abandoned after a specified period of time. Message waiting indicator device 530 includes circuitry for detecting only the distinctive ring demanded by intelligent peripheral 515. No other type of ring, including a normal ring sequence, sets the message waiting lamp, thus, the circuit is fully compatible with a normal type 1 ring sequence and so-called teen line or type 2 ring services. If telecommunications device 520 goes off-hook, intelligent peripheral 515 responds with an announcement that a voice mail message is available. Message waiting indicator 530 is turned off by manually resetting the device or by automatically resetting the device at off-hook detection.

While there has been shown and described what is at present considered the preferred embodiment of the invention it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention as defined by the appended claims.

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**Claims:**

1. A method of notifying a called party that a voice message is stored, the method comprising the steps of:
  - (a) ringing a telecommunications device with a first ring sequence;
  - (b) recording and storing a voice message;
  - (c) ringing said telecommunications device with a second ring sequence.
2. The method of claim 1 further including the step:
  - (d) activating a visual or audible indicator in response to the second ring sequence of step (c).
3. The method of claim 1 wherein the first ring sequence is a type 1 ring.
4. The method of claim 1 wherein the second ring sequence is a type 3 ring.
5. The method of claim 1 wherein said voice message is recorded and stored by a intelligent peripheral.
6. The method of claim 1 further including the step:
  - (d) announcing a second voice message if the said telecommunications device goes off-hook in response to the second ring sequence of step (c).

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7. The method of claim 2 wherein said visual indicator is a lamp.

8. A method of notifying a called party that a voice message is stored, the method comprising the steps of:

- (a) ringing a telecommunications device with a first ring sequence on a first telephone number;
- (b) recording and storing a voice message;
- (c) ringing said telecommunications device with a second ring sequence on a second telephone number.

9. The method of claim 8 further including the step:

- (d) activating a visual or audible indicator in response to the second ring sequence of step (c).

10. The method of claim 8 wherein the first ring sequence is a type 1 ring.

11. The method of claim 8 wherein the second ring sequence is a type 3 ring.

12. The method of claim 8 wherein said voice message is recorded and stored by a intelligent peripheral.

13. The method of claim 8 further including the step:

- (d) announcing a second voice message if the said telecommunications device goes off-hook in response to the second ring sequence of step (c).

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14. The method of claim 9 wherein said visual indicator is a lamp.

15. A message waiting indicator device in a telephone network for activating a visual or audible signal that a voice message has been received and stored, comprising:

coupler means for connecting said message waiting indicator device to said telephone network;

counting means coupled to said coupler means for counting the number of rings in a ring sequence and including a detector means for detecting a specified ring sequence;

driver means responsive to said counting means for activating said visual or audible signal.

16. The message waiting indicator device of claim 15 wherein the counting means further includes a programmable counter for adjusting said detector means.

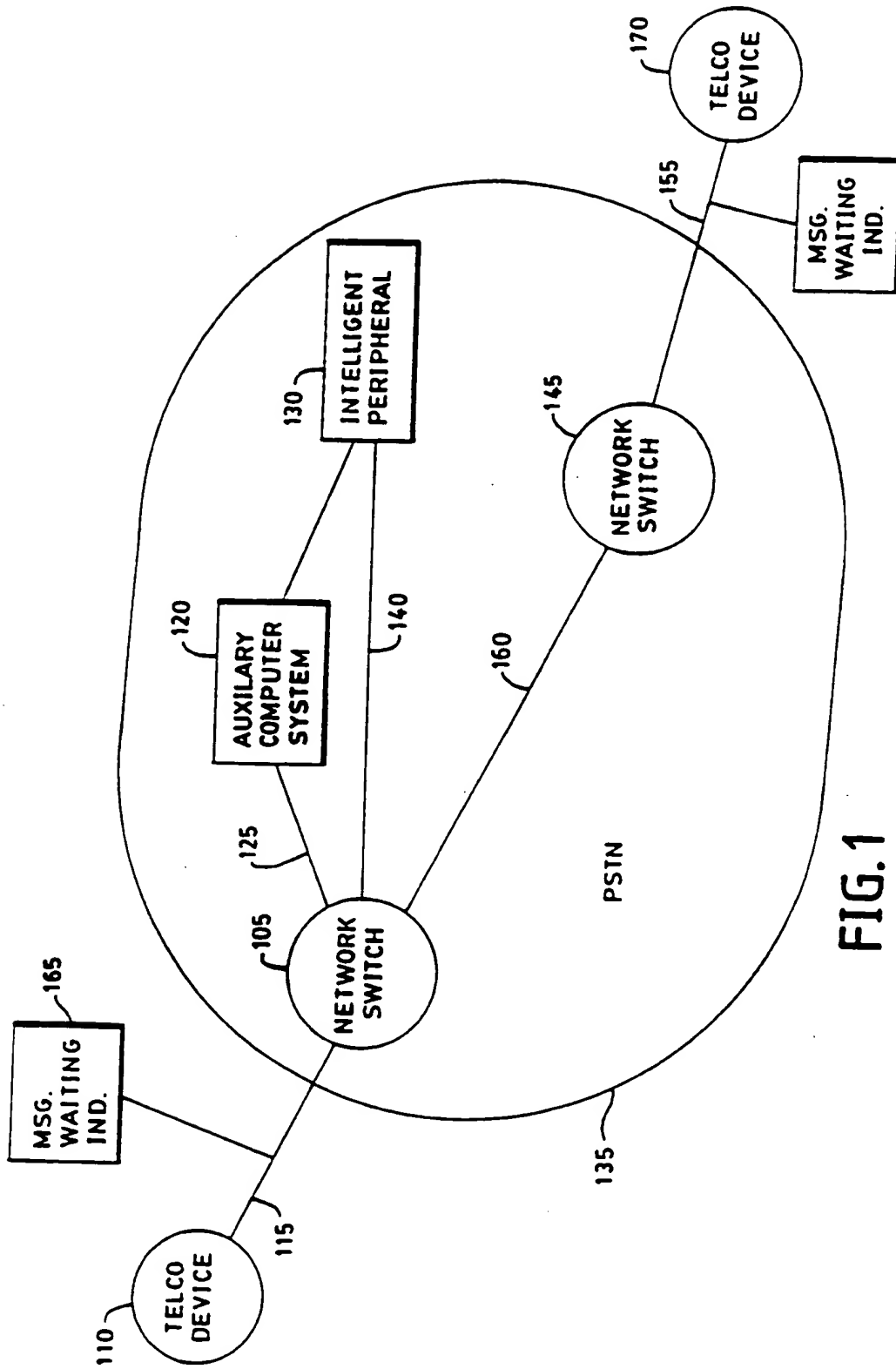


FIG.1

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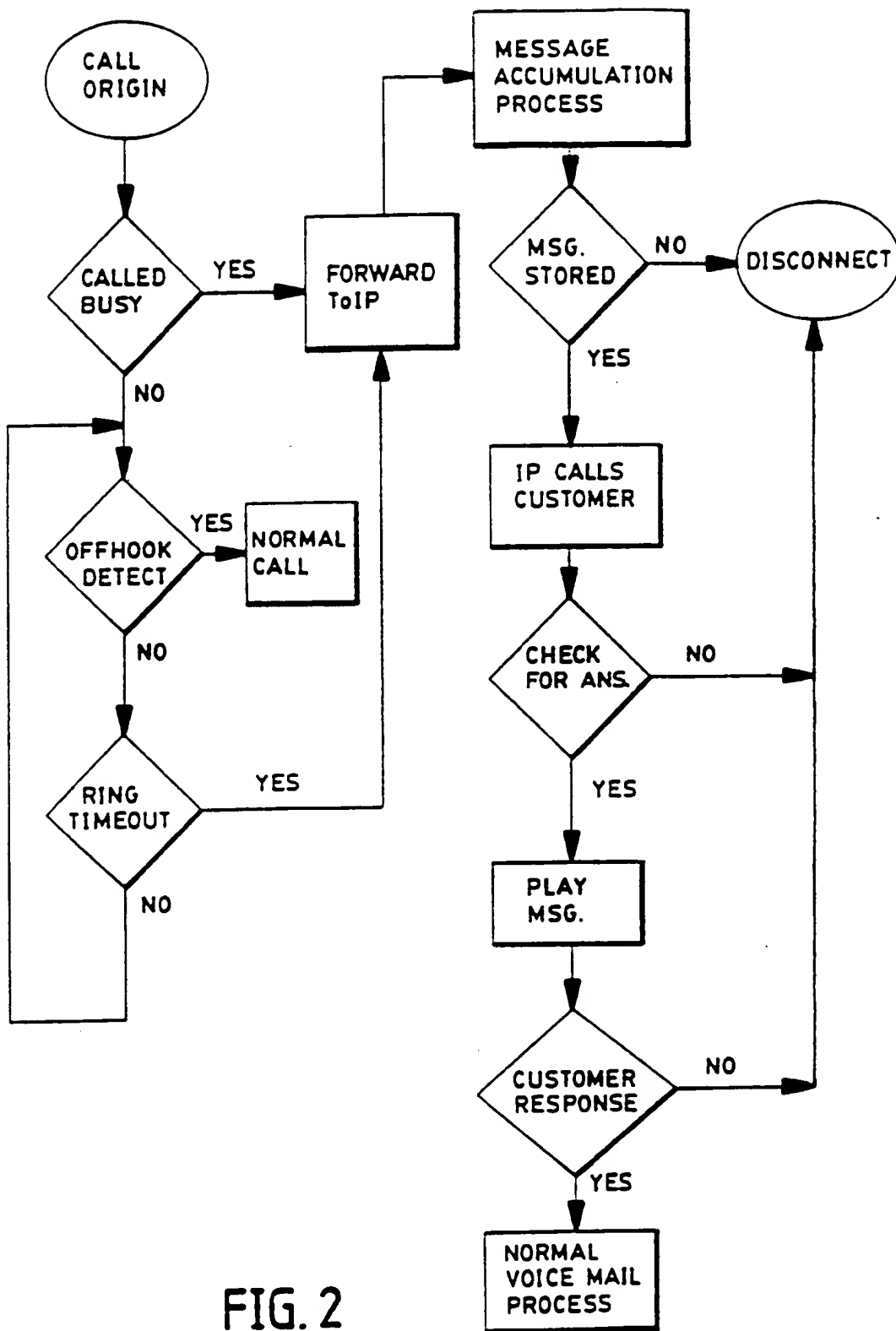


FIG. 2



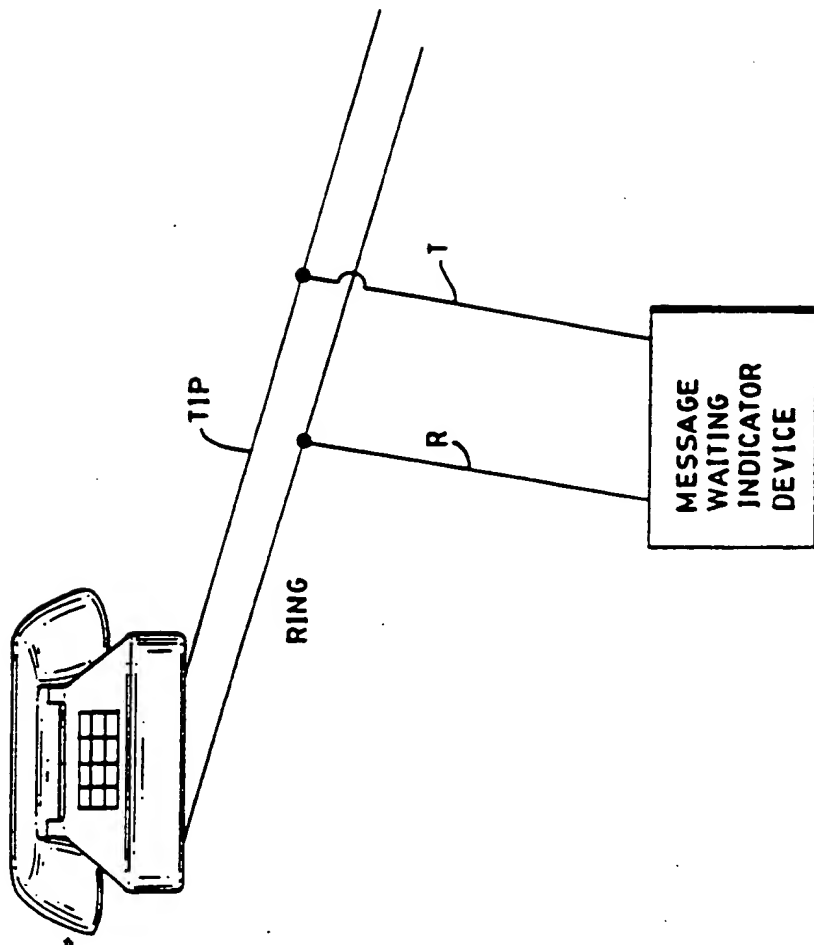


FIG. 3

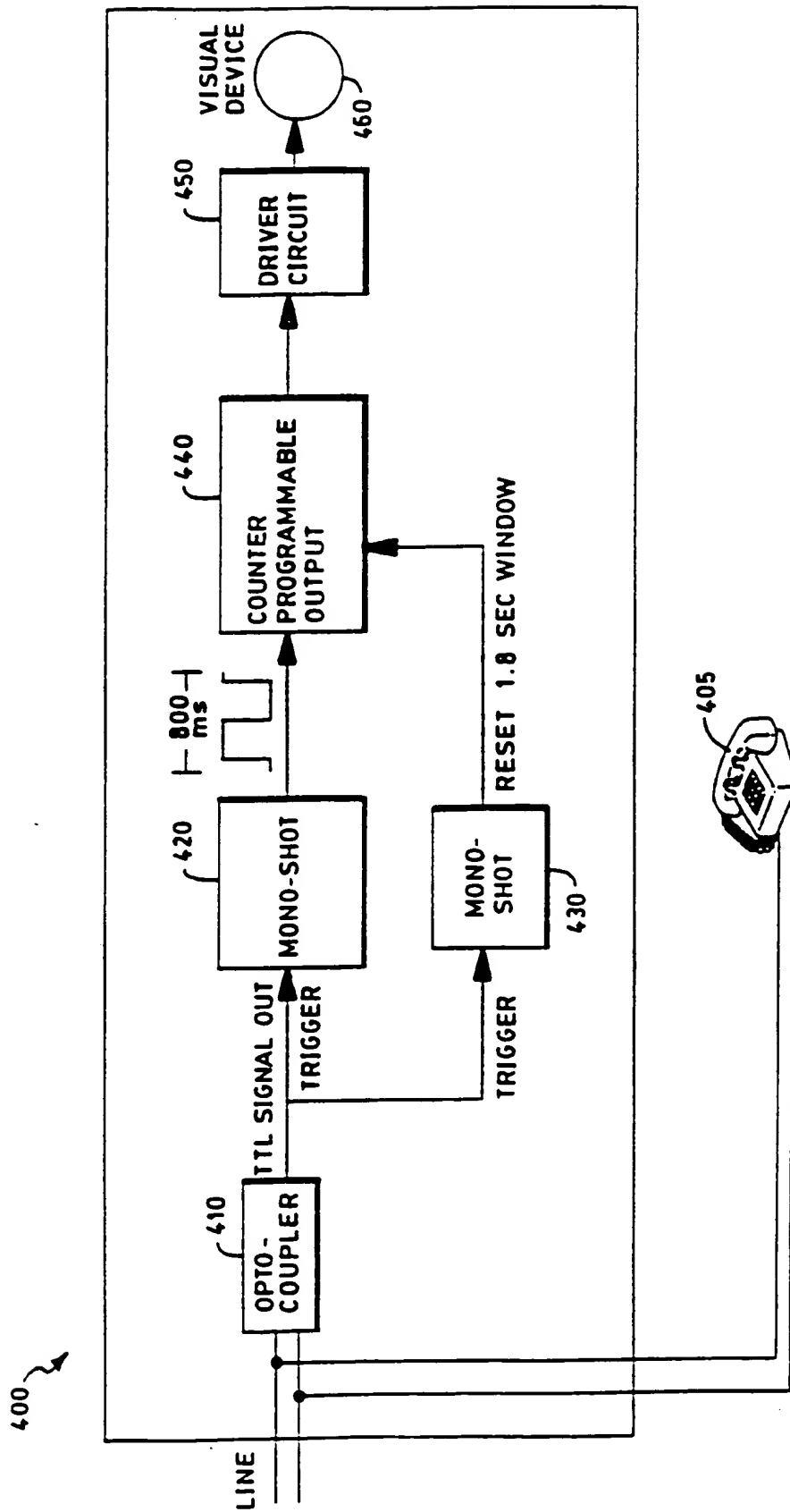


FIG. 4



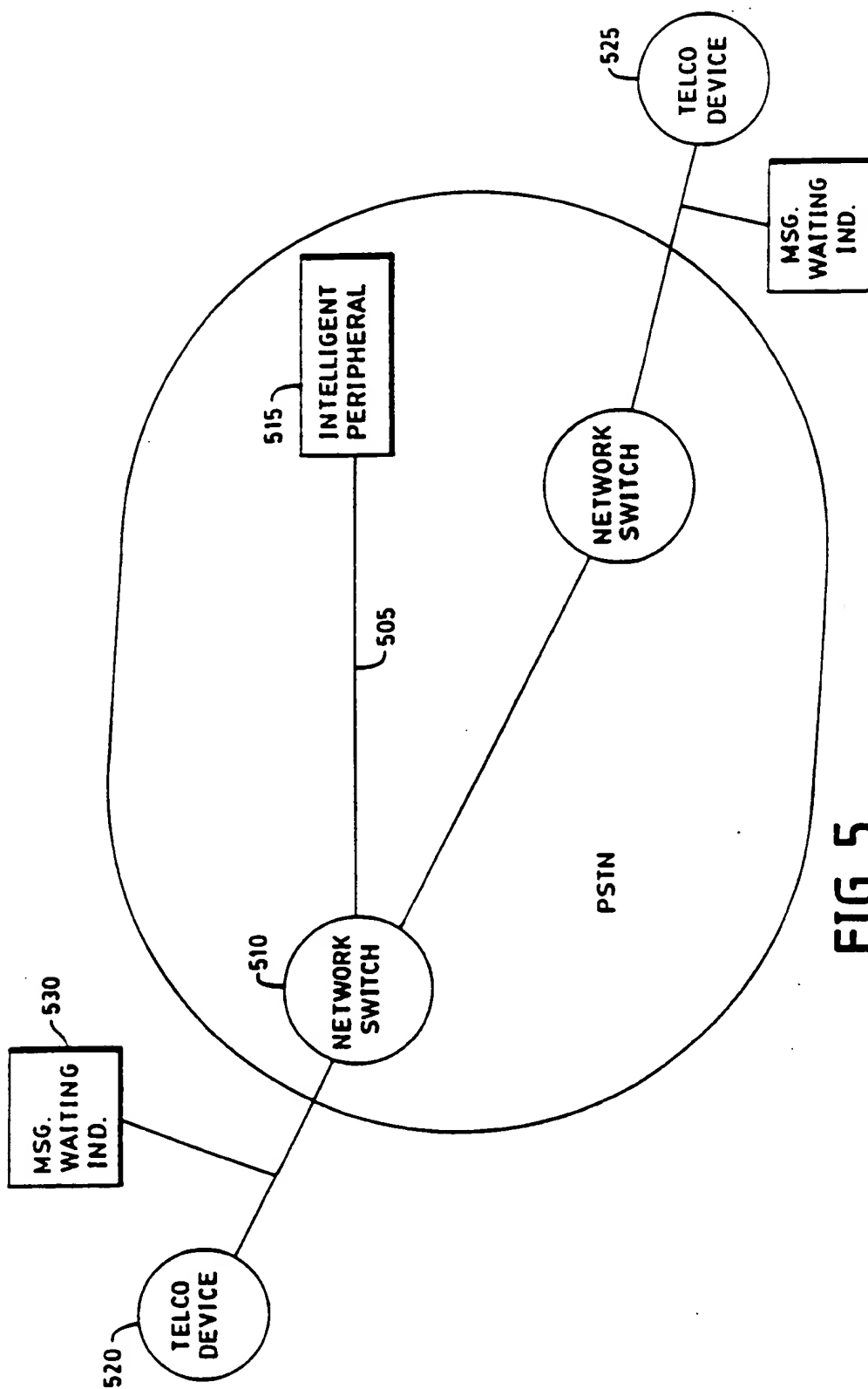


FIG. 5

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04M 1/64, 11/02

US CL :379/67, 376, 89, 201

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/67, 376, 89, 201, 88, 82, 373, 396, 84

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS, SEARCH TERMS:MESSAGE WAITING, RING SIGNAL,DISTINCT, ENCODED

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ----- Y	US, A, 4,969,186 (SAYRE II) 06 NOVEMBER 1990 COL.2, LINES 17-55; COL. 4, LINES 4-30	1 ----- 3-6,8,11-16
Y	US, A, 5,268,957 (ALBRECHT) 07 DECEMBER 1993, COL. 2, LINES 56-62	3, 4, 6, 8, 10, 11, 12, 13, 14,15,16
Y	US, A, 4,582,959 (MYSLINSKI ET AL) 15 APRIL 1986, COL.2, LINES 15-46	2,7,9,14
Y,P	US, A, 5,327,493 (RICHMOND ET AL.) 05 JULY 1994, COL. 2- COL. 5	3,4,10

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US, A, 4,766,604 (AXBERG) 23 AUGUST 1988	1,15
A	US, A, 4,782,518, (MATTLEY ET AL) 01 NOVEMBER 1988	1,2,3
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